

Introduction to Pediatric Neurology

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Key concepts, clinical approach, and foundational knowledge for students and clinicians

1. What Is Pediatric Neurology?

Aspect	Description
Definition	A subspecialty of neurology that focuses on the diagnosis, treatment, and long-term management of neurological disorders in infants, children, and adolescents.
Scope	Developmental, genetic, metabolic, infectious, traumatic, and vascular conditions that affect the immature nervous system.
Goals	• Preserve neurodevelopmental potential • Minimize disability • Support families and multidisciplinary teams

2. Unique Features of the Pediatric Nervous System

Feature	Clinical Implication
Rapid growth & plasticity	Early interventions can lead to significant functional recovery; the brain can reorganize after injury.
Age-dependent presentation	Symptoms often differ from adults (e.g., seizures may manifest as staring spells in toddlers).
Developmental milestones	Neurologic exams are anchored to age-appropriate motor, language, and social milestones.
Genetic & metabolic vulnerability	Many disorders are caused by inborn errors of metabolism or single-gene mutations that present in the first years of life.

3. Core Clinical Skills

3.1. Developmental Neurologic Examination

Domain	What to assess	Typical age-related expectations
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Cranial nerves	Pupillary response, eye movements, facial symmetry, hearing, gag reflex	Visual tracking by 2?mo; smile by 2?mo; purposeful speech by 12?mo
Motor	Tone, strength, reflexes, gait	Head control by 4?mo; sitting unsupported by 6?mo; walking by 12?15?mo
Sensory	Pain, temperature, proprioception (when feasible)	Response to pinprick by 6?mo
Language	Receptive & expressive abilities	Babbling by 6?mo; single words by 12?mo
Cognition & behavior	Attention, problem?solving, social interaction	Object permanence by 9?mo; pretend play by 2?yr

3.2. Red?Flag Symptoms

- **Seizure?like activity** (especially focal or prolonged)
- **Regression of milestones** (loss of previously acquired skills)
- **Persistent vomiting or headache** (possible intracranial pressure)
- **Asymmetrical growth or skull shape** (craniosynostosis, hydrocephalus)
- **Family history of neuro?genetic disease**

Prompt work?up is indicated when any red flag appears.

4. Common Pediatric Neurologic Disorders

Category	Representative Conditions	Typical Age of Onset	Key Clinical Clues
Epilepsy	Febrile seizures, benign Rolandic epilepsy, West syndrome	6?mo?5?yr	Convulsive or non?convulsive episodes, EEG abnormalities
Developmental delay / ASD	Global developmental delay, autism spectrum disorder	<3?yr	Delayed speech, poor eye contact, repetitive behaviors
Cerebral palsy	Spastic diplegia, dyskinetic CP	Perinatal or early infancy	Persistent motor tone abnormalities, abnormal MRI

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Category	Representative Conditions	Typical Age of Onset	Key Clinical Clues
Neurometabolic diseases	Phenylketonuria, mitochondrial disorders, urea cycle defects	Neonatal? early childhood	Poor feeding, vomiting, encephalopathy, abnormal